

# Work Order ID 60525

Tuesday, July 13, 2010 11:28:37 AM



Page 1

Item ID: D412-664-203

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 7/13/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/26/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

*W*

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool # Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D412-664-243

E

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

*8 10/08/05*

*HJ for BG 10/08/05*

110



Packaging

Packaging

Packaging

Memo

0.00

0.00

*(IX)*

*Q*

*NR 10-07-26*

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

0.00

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

*(IX)*

*Q*

*NR 10-07-27*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 60525**

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Item ID: D412-664-203

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Revision ID:

Item Name: Crosstube Aft

Start Date: 7/13/2010 Start Qty: 1.00

Required Date: 7/26/2010 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool # Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

8/10/07/20

(42)

140



Crosstubes

Crosstubes

Crosstubes

0.00

Memo

0.00

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 &amp; DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 &amp; DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # &amp; BATCH #

4-Deburr &amp; Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

MB  
10-07-28AVM  
10-07-28

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 60525**

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Item ID: D412-664-203

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Revision ID:

Item Name: Crosstube Aft

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Start Date: 7/13/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/26/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool # Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150



HandFXtube

Crosstubes Chemical Conversion

0.00

Memo

0.00

Hand Finishing Crosstubes

1 - - AW M  
10-07-10

160



QC

QC3- Inspect Part Finish

0.00

Memo

0.00

Quality Control

S 10/07/10

170



QC

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

Quality Control

S 10/07/10

No

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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# Work Order ID 60525

Tuesday, July 13, 2010 11:28:37 AM



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Item ID: D412-664-203

Accept



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Revision ID:

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Stop



Start Date: 7/13/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/26/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	<b>Memo</b>	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: <u>123824</u> as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190 	Packaging	0.00							
Packaging	<b>Memo</b>	0.00							
Packaging	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200 	QC5- Inspect part completeness to step on W/O	0.00							
QC	<b>Memo</b>	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								

*PS 10-7-30*

*PTO*

*PS 10/8/3*

*MI 10 08 03 ①*

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D412-664-203 PAR #:          Fault Category: X-tubes NCR: Yes No DQA:          Date: 1008-09  
 Resolution: re-work Disposition: re-work QA: N/C Closed:          Date: 10/08/09

NCR: <u>60525</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>100730</u>	<u>180</u>	<u>indications were found on inside of tubes underside: Longitudinal R.C. Process</u>	<u>[Signature]</u>	<u>Regrind + inspect by NDT (tube pushed ref NDT results)</u>	<u>[Signature]</u> <u>10-07-03</u>	<u>S</u> <u>10/08/05</u>	<u>[Signature]</u>	<u>S</u> <u>10/08/05</u>
				<u>re-align + continue</u>	<u>ml</u> <u>10-08-03</u>			

NOTE: Date & initial all entries



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Item ID: D412-664-203

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Stop



Item Name: Crosstube Aft

Start Date: 7/13/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/26/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool # Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

210

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2  
2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 9:00

Finish Time: 10:00

PAINT:

Start Time: 1:30

Finish Time: 3:00

ml

10

08

03 (1)

220

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

25

10-08-04

(x1)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

# Work Order ID 60525

Tuesday, July 13, 2010 11:28:37 AM



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Item ID: D412-664-203

Accept



Setup Start



Revision ID:

Item Name: Crosstube Aft

Stop



Start Date: 7/13/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/26/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool # Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

230



Crosstubes

Crosstubes

0.00

Memo

0.00

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond

Batch: 114158

Expiry Date: 07/2011

3-Install clamps as per Dwg D212-664-203 using installation jig DT9024 with 0.010 thick brass shims on both chafing shield (D3189-1). Torque clamps to 80-100 in lb.

ml 10 08.04

ml

10

08

04

①

240



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

8/10/05

(X)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

**Work Order ID 60525**

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Item ID: D412-664-203

Revision ID:

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Start Date: 7/13/2010 Start Qty: 1.00

Required Date: 7/26/2010 Req'd Qty: 1.00

Reference:

Accept



Setup Start

Stop

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool # Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250



Packaging

Pick Kit

0.00

Memo

0.00

260



QC

Quality Control

QC4- 100% Inspect kits for completeness

0.00

Memo

0.00

270



Packaging

Packaging

0.00

Memo

0.00

Identify and pack for shipping as per PPP D412-664-203  
\*\*\*\*\*Ensure tube is not packaged if curing time is less than 12 hrs, see step 27  
for application time & date \*\*\*\*\*  
Time & date of packaging: 7/13/10  
Location: 11

10/8/10 sf

EC

Cupps ①

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 60525**

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Item ID: D412-664-203

Revision ID:

Item Name: Crosstube Aft

Start Date: 7/13/2010 Start Qty: 1.00

Required Date: 7/26/2010 Req'd Qty: 1.00

Reference:

Accept



Setup Start



Stop



Cust Item ID:

Customer:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool # Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/08/06 *[Signature]*

MF 10-8-05

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



# Picklist Print

Tuesday, July 13, 2010 11:28:40 AM

Page 1

Work Order ID: 60525

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 7/13/2010




Required Date: 7/26/2010

Start Qty: 1.00

Required Qty: 1.00

## Comments:

IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS  
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM  
 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM  
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-203TRN  Crosstube Turning Detail		Manufactured	No			110	Each	2.0000	1	1			
<div> <div>Location</div> <div> <div>LG</div> <div>59961</div> <div>59962</div> </div> <div>Loc Qty</div> <div> <div>2</div> <div>1</div> <div>1</div> </div> </div> <div> <div>Loc Code</div> <div></div> </div>													
D2856-600  Abrasion Strip		Manufactured	No			230	f	225.1940	1.76	1.76			
<div> <div>Location</div> <div> <div>ST403</div> <div>25656</div> <div>26650</div> <div>37668</div> </div> <div>Loc Qty</div> <div> <div>225.194</div> <div>1.25</div> <div>2.5</div> <div>221.444</div> </div> </div> <div> <div>Loc Code</div> <div></div> </div>													
D2896-1  Support		Manufactured	No			230	Each	25.0000	1	1			
<div> <div>Location</div> <div> <div>LG</div> <div>43209</div> <div>47820</div> <div>58356</div> </div> <div>Loc Qty</div> <div> <div>25</div> <div>1</div> <div>16</div> <div>8</div> </div> </div> <div> <div>Loc Code</div> <div></div> </div>													

MA 10-07-26

IX

MA 10-08-04

MA 10-08-04

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 60525

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 7/13/2010

Required Date: 7/26/2010

Start Qty: 1.00

Required Qty: 1.00

D3189-1

Manufactured No

230 Each

38.0000

2 2



Chafing Shield

## Location

## Loc Qty

## Loc Code

FG	2
36065	2
LG	36
56353	16
58960	20

D3595-063-570

Manufactured No

230 Each

7.0000

4 4



RUBBER CUSHION

## Location

## Loc Qty

## Loc Code

FG	4
37971	4
LG	3
45509	3

MS21920-28

Purchased No

230 Each

121.0000

4 4



Clamp(per MIL-DTL-8783C)

## Location

## Loc Qty

## Loc Code

FG	5
105884	5
LG	116
112863	24
114749	92

Tuesday, July 13, 2010 11:28:41 AM

Shop Packet Print

Page 2

mt 10.08.04

mt 10.08.04

mt 10.08.04

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Work Order ID: 60525



Parent Item: D412-664-203



Parent Item Name: Crosstube Aft

Start Date: 7/13/2010

Required Date: 7/26/2010

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

250

Each

204.0000

6

6



Nut



10/8/53f

Location

Loc Qty

Loc Code

ST300

204

111578

4

114495

200

Tuesday, July 13, 2010 11:28:41 AM

Shop Packet Print

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W/O:		WORK ORDER CHANGES						
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

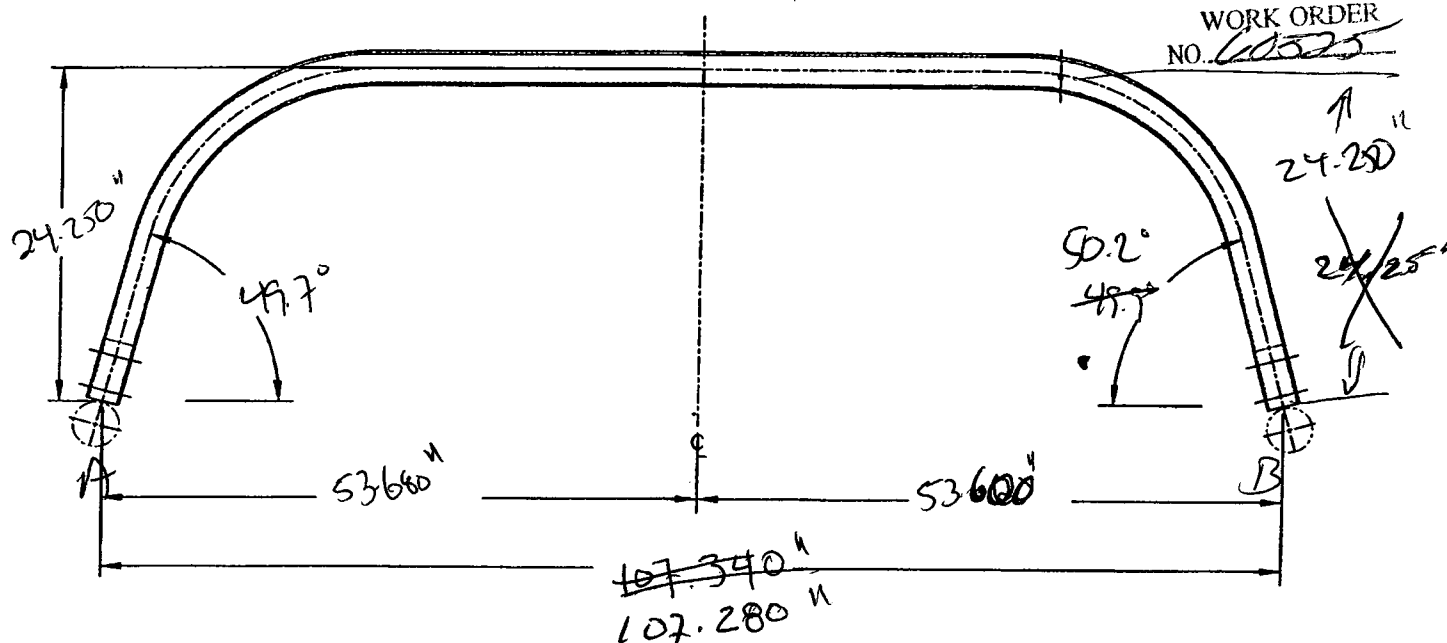
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: E			Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 60525



Comments

QC15 Inspection	<u>S</u>
Date	<u>10/01/28</u>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	<u>7</u>

W/O:			WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
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SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 40525  
BK10-7-13

**RELEASED**  
2009-10-29

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA REV. E D412-664-243 SHEET 1 OF 4 TITLE CROSSTUBE ASSEMBLY (412 HI AFT) NTS COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DRAWN	RF		
CHECKED	PH		
MFG. APPR.	PH		
APPROVED	PH		
DE APPR.	PH		
DATE	09.09.30		

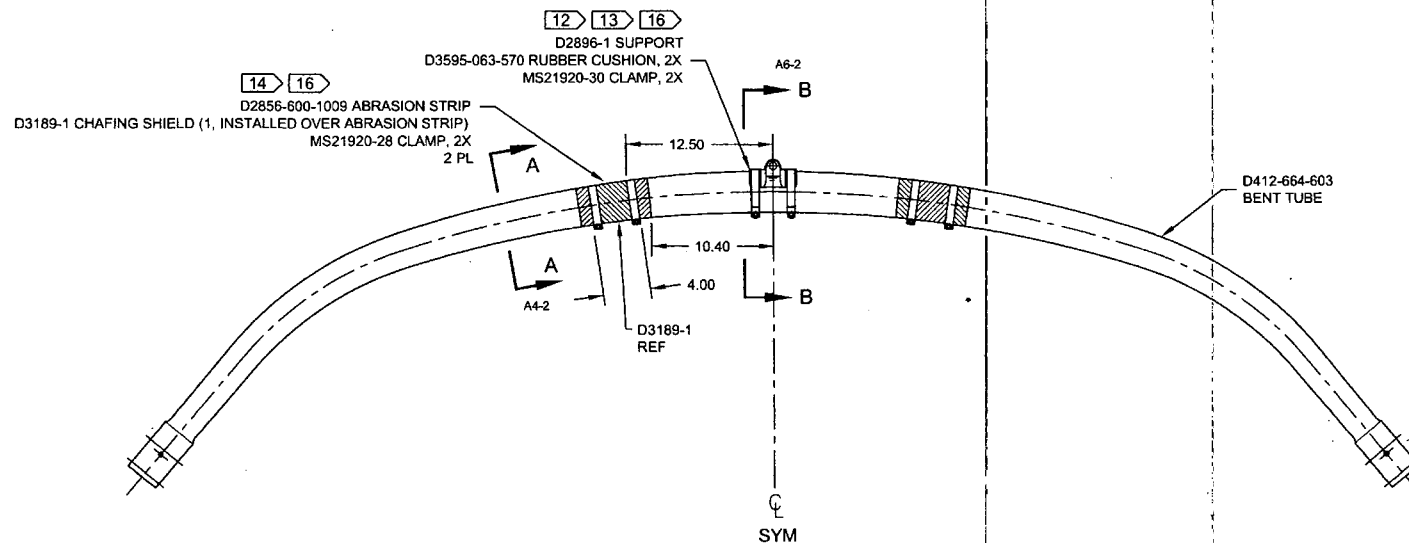
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

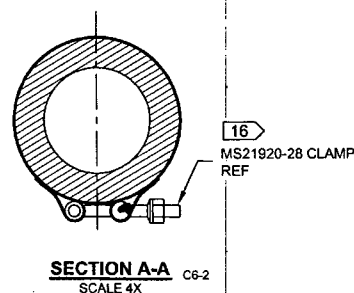
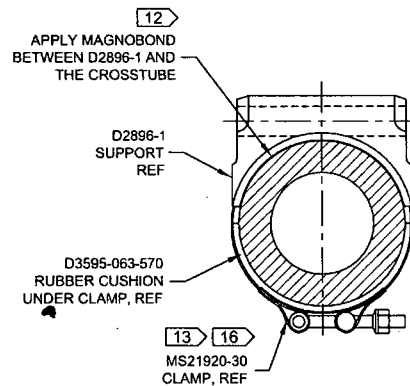
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**D212-664-243**  
**ASSEMBLY DETAIL**



**RELEASED**  
2009-10-28  
MR

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	B	D412-664-243	SHEET 2 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

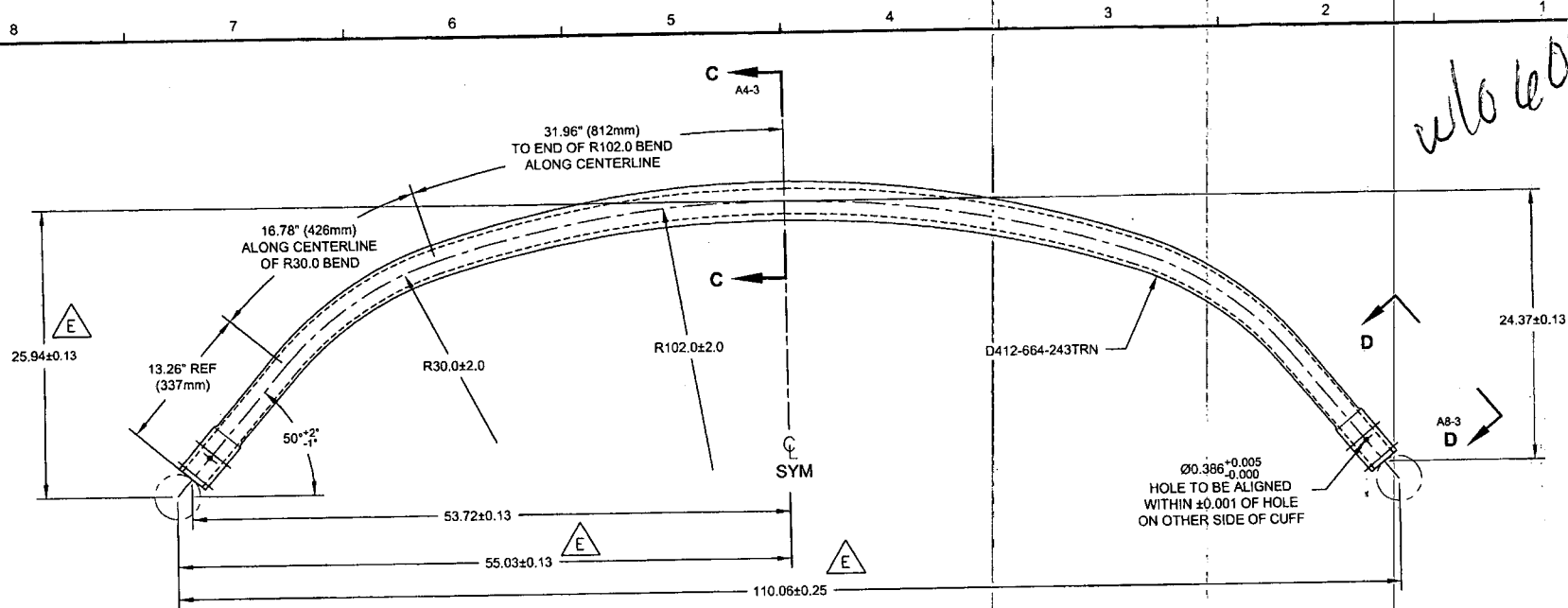
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

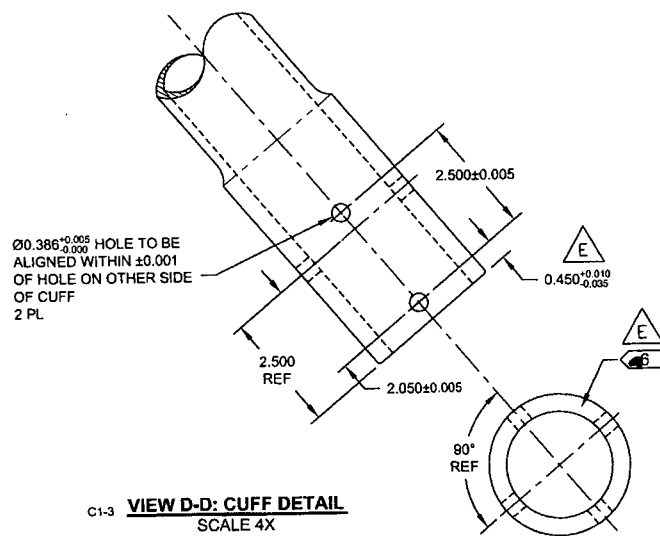
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

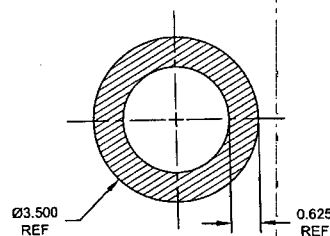
WLO 60525



**D412-664-603**  
**BENDING AND DRILLING DETAIL**



**VIEW D-D: CUFF DETAIL**  
SCALE 4X



**SECTION C-C**  
SCALE 4X

**RELEASED**  
2009-10-29

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DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 3 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	H	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

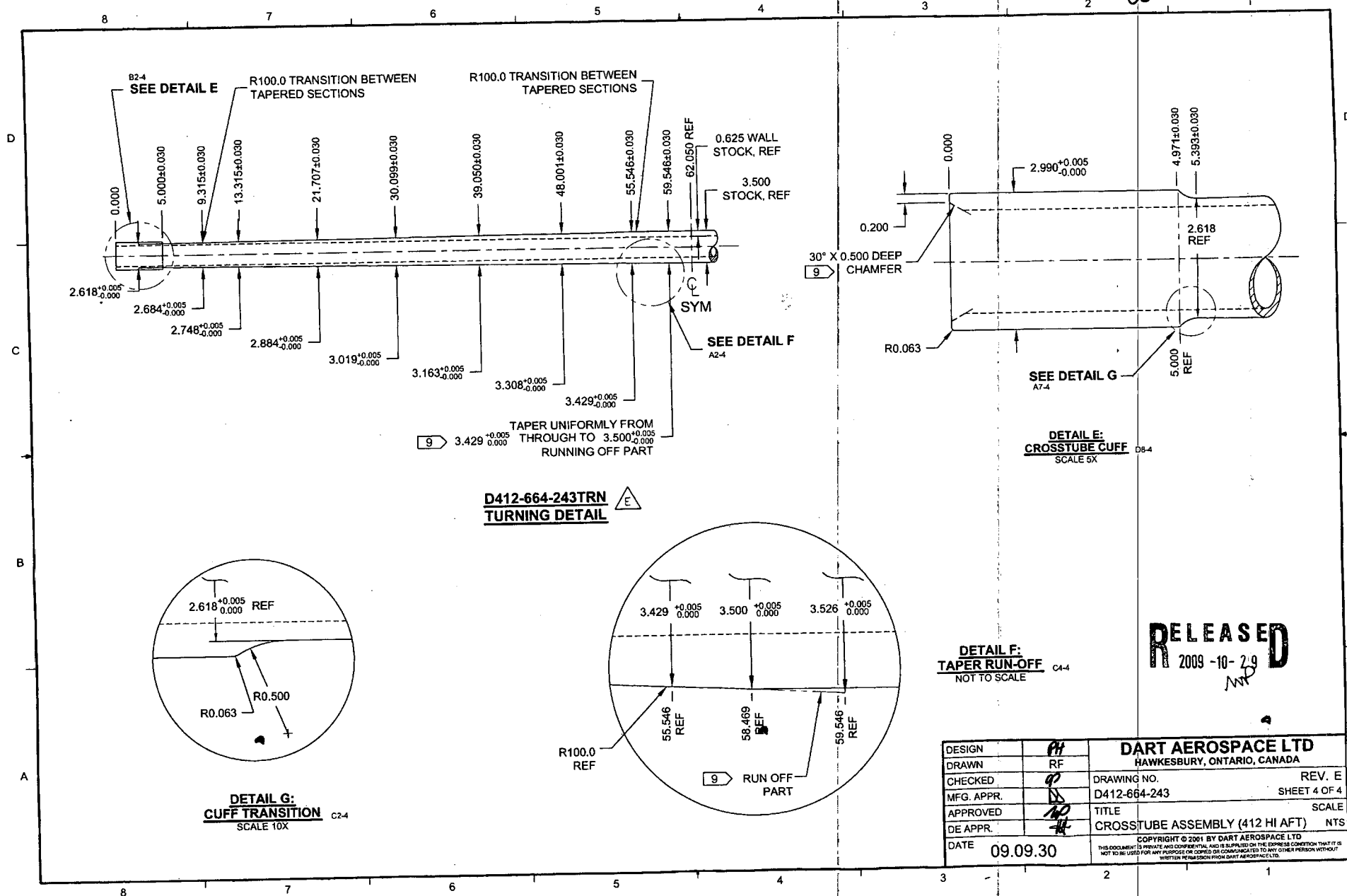
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

W1060526



**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries





# LIQUID PENETRANT TEST REPORT

P- 15185

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE July 30-2010 TIME AM ☒ PM ☐  
ATTENTION LINDA/CHANTEL ACUREN JOB NO. 188-10-0814  
ADDRESS 1270 ABERDEEN STREET. POWO NO. 723521  
HAWKESBURY ON. WORK LOCATION HAWKESBURY PLANT.  
K&H 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007  
PROJECT F.P.I. ON CROSS TUBES  
ITEM(S) EXAMINED 4 PCS.

JOB DESCRIPTION PROCEDURE NO. LT-0002 REV./DATE TECHNIQUE NO. LT-0002 REV./DATE  
PART NO. — MATERIAL ALUMINE ALUMINUM THICKNESS —  
SCOPE WET FLOUORESCENT LIQUID PENETRANT  
INSPECTION CARRIED OUT 100% EXTERNAL

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT 2L 67 MINIMUM DWELL TIME 4.50 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO  
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 07-19  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY 2010

TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ( ☐ METRIC ☐ IMPERIAL )  
1 CROSS TUBE, W.O. 60526 ✓  
1 CROSS TUBE, W.O. 60525 ✓  
1 CROSS TUBE, W.O. 60521 ✓  
1 CROSS TUBE, W.O. 60522 ✓  
10 08 07

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES  
CLIENT REPRESENTATIVE Linda Lavelle DTR # EG3374  
TECHNICIAN (SIGNATURE): Mike Johnston REPORT REVIEWED BY:  
NAME (PRINT): Mike Johnston NAME INITIALS  
CGSB LEVEL 4 SNT LEVEL — CGSB LEVEL — SNT LEVEL —  
CGSB REG. NO. 6606 CGSB REG. NO. —

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